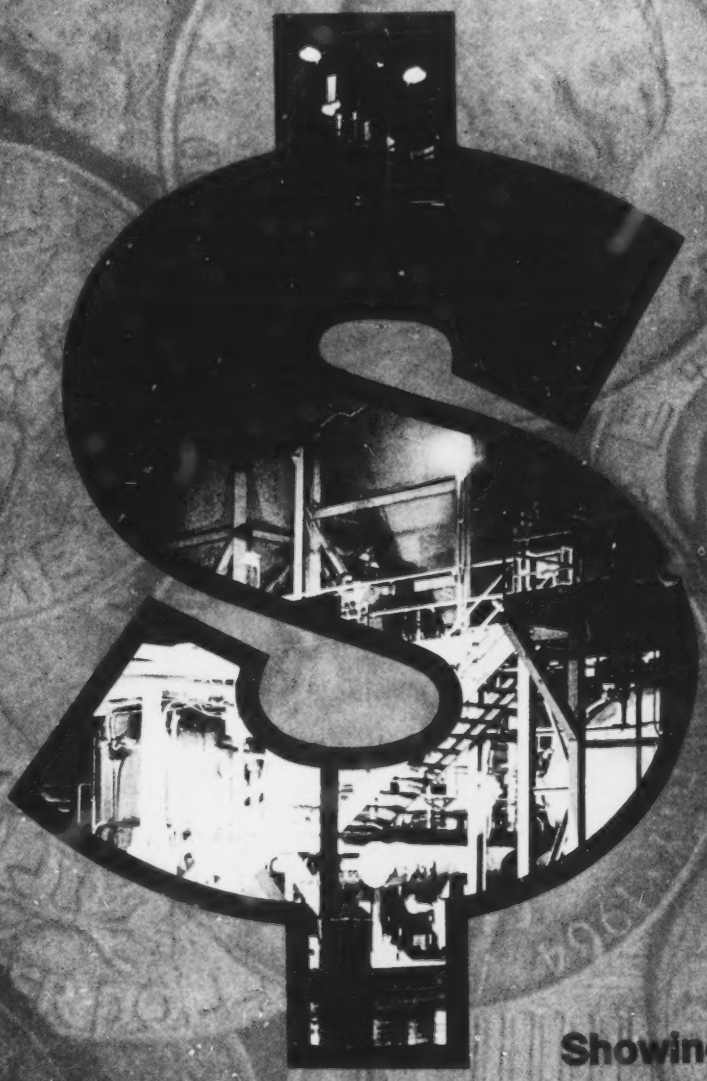
A1250-1 11/16/83

NOVEMBER 14, 1983

CHEMICAL & ENGINEERING

NEWS



Chemical Earnings

Showing their new power Page 10

0511179C094 9 W AR6146SL 1
CONGRESSIONAL INFO SERV
4520 EAST WEST HWY SUITE 800
SRI ACQUISITIONS
BETHESDA MD 20814

CHEMICAL & ENGINEERING
NEWS

Volume 61, Number 46
CENEAR 61 (46) 1–70
ISSN 0009-2347

NOVEMBER 14, 1983

News of the Week

■ **New polypropylene process of Union Carbide and Shell Chemical is less expensive, more energy-saving than conventional processes.** **Page 6**

■ **House passes tough hazardous wastes bill.** **Page 7**

■ **A fusion experiment exceeded the energy break-even point in tests at MIT lab.** **Page 8**

■ **Presidential task force finds ways to cut $12 billion in federal R&D spending.** **Page 8**

■ **New molecular sieve catalysts convert synthesis gas to motor fuels in high yields.** **Page 8**

Business

Polyurethane markets are showing signs of maturity, marketing manager warns, urging search for new processes, uses. **Page 16**

International

Sales and earnings of Canadian chemical companies improved for second consecutive quarter; Middle East oil producers prepare to enter competitive world petrochemical market. **Page 17**

Government

Bill to amend federal pesticides act, favored by environmentalist groups, moves ahead in House but Senate ignores it. **Page 25**

Science

Molecular computer advocates are enthusiastic, but are yet unable to build the necessary components; company set up to encourage basic research on genetic mechanisms that control aging. **Page 33**

Education

The growing use of computers in engineering education will allow students to learn design strategies, promote self-study; industrial labs offer polymer science training to academics. **Page 37**

ACS News

History of Garvan Medal winners parallels that of women chemists in their struggles for recognition and equality. **Page 53**

Letters 4
Editor's Page 5

Concentrates
Business 9
Government 24
Science/Technology 30

The Departments
Books 41
New Products 48
ACS Comment 52
Awards 55
Newscripts 70

Cover Story

U.S. chemical industry third-quarter reports confirm earnings recovery by showing even higher gains than previous quarter. **Page 10**

POLYPROPYLENE: New process is simpler, cheaper

Union Carbide and Shell Chemical last week introduced a long-awaited process for manufacturing polypropylene. Called Unipol PP, the process, the two companies say, is much simpler, less expensive to install, and much more energy-efficient than conventional polypropylene processes.

In so doing, the partners have extended the revolution in thermoplastics technology since the mid-1970s. It began with independent new processes from Carbide and Dow Chemical for low-density polyethylene. Producing a new "linear" type of resin, these processes so transformed production economics that nearly all new LDPE plants in the world are expected to use them.

Since the first new processes, it has been only a question of time until analogous technology reached other polymers. R&D in this area has been top priority. Over the past year, rumors became rife that polypropylene would be the next breakthrough, and now the news is out.

The new polypropylene technology—a gas-phase, fluidized-bed process—is targeted for existing polypropylene plants as well as new plants. It makes a full range of polypropylene grades.

Shell, the second largest U.S. polypropylene producer (after Hercules) with about 12% of capacity, and Carbide (not a current producer) also disclosed that they would build a 200 million lb-per-year polypropylene plant at Seadrift, Tex., converting a shut-down Carbide high-pressure low-density polyethylene plant. The two companies will share an interest in the plant, but declined to say what the percentage ownership for each would be. Output from the plant will be marketed by Shell. Completion is scheduled for 1985.

The new process will be offered for licensing worldwide by Carbide through its Unipol Systems department.

If the new process does what the two companies claim, it is indeed a wonder. Union Carbide executive vice president H. F. Tomfohrde says, "Our new Unipol PP process will turn back the hands of inflation on polypropylene technology. It will cost about one third less to build a new Unipol PP plant today than it cost to build a state-of-the-art polypropylene plant 10 years ago." During that time, according to Tomfohrde, construction costs have increased 130%. "Furthermore," he says, "investment costs for Unipol PP will be a minimum of 20% lower than those for any other 'new generation' gas- or liquid-phase polypropylene process."

Carbide has successfully demonstrated process at Seadrift plant

Polypropylene at a glance

U.S. capacity: 5.1 billion lb

1982 production: 3.5 billion lb

1983 production (estimated): 4.4 billion lb

1983 value of production (estimated): $1.7 billion

Capacity utilization: 86%, third-quarter 1983

List price: 40 to 45 cents per lb

Major uses: Injection molding 40%, fibers 30%, film 10%

Producers: Arco Chemical, Eastman Kodak, El Paso, Exxon, Gulf Oil, Hercules, Internorth, Phillips Petroleum, Shell Chemical, Soltex Polymer, Standard Oil (Ind.), U.S. Steel

Roger B. Staub, vice president and general manager of the Unipol Systems department, estimates that it would cost 12 to 14 cents per annual pound to build a polypropylene plant using the new technology. A 300 million lb plant thus would cost $40 million to $45 million, he says.

Carbide says that converting an existing plant will cost about 40% less than building a plant with exactly the same capabilities.

The two companies say that operating costs with the new system will be much lower. According to the firms, the plant uses 75% less energy than a conventional liquid-phase polypropylene process.

James R. Street, president of Shell Chemical, says that the process requires no spent catalyst separation. And the production of by-product atactic polymer is so slight that it does not have to be removed. Unipol PP uses a Shell super-high-activity catalyst that has been optimized for

the process, according to Street. The proprietary catalyst seems not to have been designed especially for this process, however. Street says the company has been making the catalyst for two years.

Unlike Unipol linear low-density polyethylene, the partners say, the new process gives a product with substantially the same processibility specifications as those for polypropylene made in conventional plants.

According to Carbide, not only can existing polypropylene plants be converted to the new process, but high- and low-density polyethylene facilities and even polystyrene plants can be converted. The conversion essentially would involve replacing the reactor and retaining most of the support equipment in the plant.

The reactor in the process is the same as the one used for the Unipol polyethylene processes. Thus, once the reactor is installed, the plant can be switched between different products. The change would take five or six days, Carbide says. However, consultants tell C&EN that the switch would be more complicated than that, because most polyethylene plants in the U.S. do not have a propylene feedstock mechanism.

It had been speculated that Hercules, the largest U.S. polypropylene producer, might be hurt by this new process, but since that company went into a joint venture with Montedison to form Himont, the danger is not so great, according to industry sources.

One consultant says that there are probably comparable overall economics between the Montedison process used in the joint venture and the new Unipol PP process. Hercules has declined to comment on the new Union Carbide/Shell process.

However, Carbide and Shell are claiming a 75% energy savings, whereas Montedison claims a 30% savings in power consumption. The difference, according to Carbide, is that pushing the gas around is more efficient, and therefore cheaper, than pumping liquid as in the Montedison process.

Consultants feel that Carbide and Shell will have to prove their process in actual plant use before a strong licensing effort can start to pay off. "After all," one consultant says, "Montedison already has two plants operating in Italy using its process, so it is much easier to assess the product." □

House passes stringent hazardous wastes bill

It took four days of debate spread out over four months, but the House finally passed a package of stringent amendments to the Resource Conservation & Recovery Act (RCRA), which governs the disposal of hazardous wastes.

The chemical industry has termed the bill punitive, saying compliance with its provisions will cost the industry millions of dollars. Universities are concerned because, if the bill is enacted in its present form, it may well lead to an end of their ability to dispose of their wastes in specially designed lab packs.

The bill requires the Environmental Protection Agency within 18 months of passage to issue regulations governing the disposal of hazardous wastes by small-quantity generators—those producing between 100 and 1000 kg per month of hazardous wastes. If the agency fails to do so, these generators will be required to meet the same regulations now imposed on large-quantity generators within 30 months.

It also prohibits dumping in landfills of noncontainerized liquid hazardous wastes and of 12 specific waste streams, mostly those contaminated with heavy metals, polychlorinated biphenyls, and halogenated organic compounds in total concentration greater than or equal to 1 g per kg, unless EPA determines that land disposal is not a threat to health or the environment in a particular case. EPA also would have to develop a schedule for reviewing all other hazardous wastes, both liquid and solid, to determine whether a prohibition on their land disposal is warranted. If the agency fails to complete the review within four and a half years, all methods of land disposal would be prohibited.

Florio: plugs number of loopholes

The House amendments would phase out over six years disposal of toxic wastes in unlined pits, ponds, and lagoons; require double liners in many existing facilities; and prohibit the injection of hazardous wastes into or above underground sources of drinking water.

Rep. James J. Florio (D.-N.J.), the primary author of the bill, says it plugs a number of loopholes in the current law. He points out that recently "much attention has been focused on the Superfund law and the problems it was designed to solve, namely, what to do with abandoned hazardous waste facilities that threaten public health. Yet without improvements in current law (RCRA), we are creating tomorrow's Superfund sites today." And it's cheaper to prevent rather than clean up, he says. EPA estimates the current cost of disposing hazardous wastes in accordance with RCRA at $90 per ton. On the other hand, the cost of cleaning up improperly disposed of hazardous wastes is about $2000 per ton.

The chemical industry's last chance for changing the bill is on the Senate floor. The Senate Environment & Public Works Committee has reported out a bill that is very similar to the one passed by the House. Committee chairman Robert T. Stafford (R.-Vt.) hopes to get that bill to the Senate floor before Congress recesses late this month. □

Chemical Earnings Accelerate Their Rebound

William J. Storck and David Webber
C&EN New York

It looks as if all the work that U.S. chemical producers have done over the past couple of years to lower operating costs and improve plant efficiencies finally is paying off. The chemical earnings recovery is well under way, indeed is accelerating.

In this year's third quarter both sales and earnings for chemical producers as well as oil companies and diversified firms that produce chemicals showed healthy increases. The rise was especially strong for basic chemical companies, whose earnings increased more than four times as fast as revenues.

For the full year in 1983, it is still nip and tuck whether chemical companies can get earnings up from 1982. There is little doubt that sales will be up for the year, but it will take an extremely strong earnings increase in the fourth quarter to pull the full-year total even with last year, let alone allow an increase.

Fortunately, chemical earnings for the fourth quarter are going up against an abnormally weak fourth period of 1982. So chemical companies may just be able to pull off the required gain for a full-year increase, expecially if there is any upturn in chemical pricing.

C&EN, therefore, is predicting that for the full year, chemical company earnings likely will be about even with last year, while sales will be up about 3%. Unfortunately this is going to make profit margins on sales a bit lower than in 1982.

Although producers got little help from prices in the third quarter, which according to government figures were unchanged from last year's third quarter, demand for

Chemical industry leaders for third-quarter . . .

Sales			Earnings[a]			Profitability		
Rank	$ Millions	Rank 1982		$ Millions	Rank 1982		Earnings as % of sales	Rank 1982
1 Dow Chemical	$2762.0	1	Monsanto	$99.0	1	International Flavors	15.1%	1
2 Union Carbide	2274.0	2	Dow Chemical	86.0	5	Freeport-McMoRan	13.7	2
3 Monsanto	1553.0	3	Union Carbide	80.6	2	Loctite	10.5	8
4 W. R. Grace	1506.0	4	PPG Industries	69.6	4	Nalco Chemical	10.3	4
5 PPG Industries	930.0	6	Hercules	43.8	6	Lubrizol	7.5	11
6 American Cyanamid	889.5	5	American Cyanamid	41.1	7	Petrolite	7.5	5
7 Celanese	811.0	7	Celanese	33.0	30	PPG Industries	7.5	13
8 Hercules	670.0	8	Rohm & Haas	32.1	13	Air Products	7.1	9
9 National Distillers	632.1	9	Ethyl	30.0	11	Chemed	7.1	10
10 Olin	486.3	10	Morton-Thiokol	29.6	17	Rohm & Haas	7.0	17

. . . and for nine-months 1983

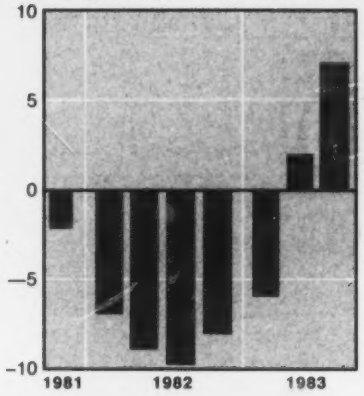
Sales			Earnings[a]			Profitability		
Rank	$ Millions	Rank 1982		$ Millions	Rank 1982		Earnings as % of sales	Rank 1982
1 Dow Chemical	$8028.0	1	Monsanto	$303.20	2	International Flavors	15.6%	1
2 Union Carbide	6645.7	2	Dow Chemical	233.0	1	Freeport-McMoRan	11.5	2
3 Monsanto	4648.0	3	Union Carbide	190.2	3	Nalco Chemical	10.1	3
4 W. R. Grace	4465.7	4	PPG Industries	164.6	6	Loctite	9.4	11
5 PPG Industries	2720.0	6	Hercules	124.0	5	Petrolite	8.0	3
6 American Cyanamid	2612.0	5	American Cyanamid	111.2	8	Rohm & Haas	7.6	16
7 Celanese	2411.0	7	Rohm & Haas	108.9	12	Lubrizol	7.4	9
8 Hercules	1985.0	8	W. R. Grace	101.7	4	Chemed	6.9	7
9 National Distillers	1882.4	11	Air Products	81.1	9	Air Products	6.5	8
10 Olin	1449.7	10	Ethyl	79.1	10	Monsanto	6.5	10

a After taxes. **Note:** For 30 companies listed on page 12.

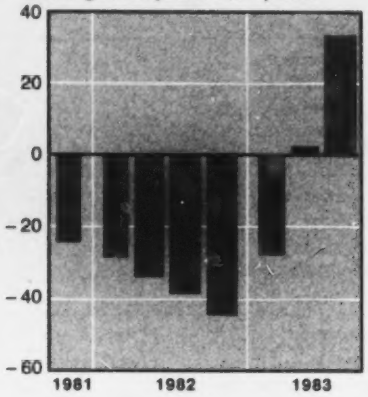
Chemical industry third-quarter results

- Sales increased 7%
- Earnings climbed 34%
- Profitability rose to 4.3%
- Production jumped 12%
- Prices are almost flat

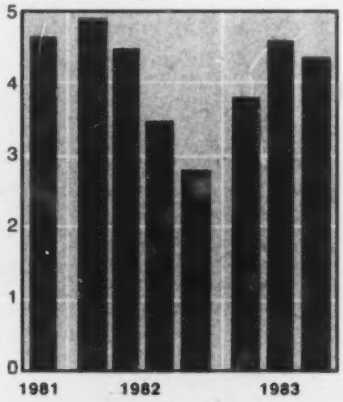
Sales
% change from year-earlier quarter



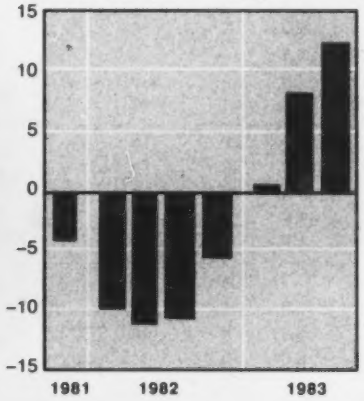
Earnings
% change from year-earlier quarter



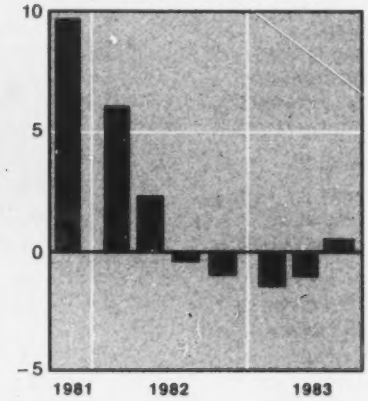
Profit margins
After-tax earnings as % of sales



Production
% change from year-earlier quarter

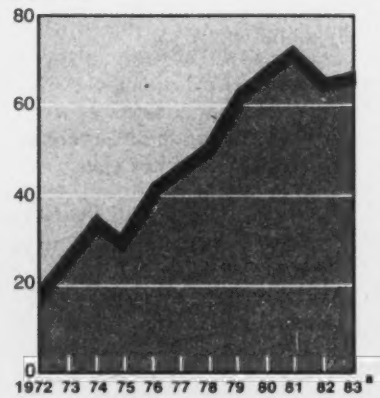


Prices
% change from year-earlier quarter

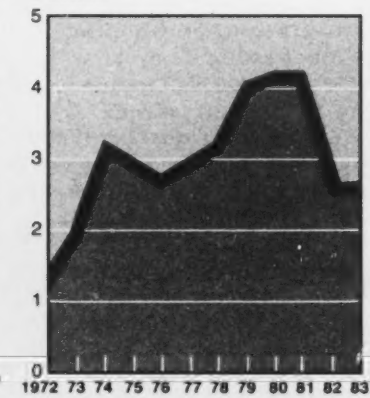


Sales for 1983 will be up about 2%, and earnings will struggle to stay even, dropping profitability slightly

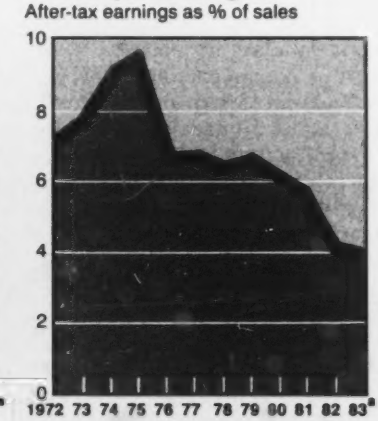
Annual sales
$ Billions



Annual earnings
$ Billions



Annual profit margins
After-tax earnings as % of sales



a C&EN estimates. **Note:** All sales, earnings, and profit-margin data are based on the combined performance of the 30 chemical companies listed on page 12.

Earnings gains far outstripped sales increases in third quarter

	THIRD-QUARTER 1983						NINE-MONTHS 1983			
	Sales ($ millions)	Earnings[a] ($ millions)	Change from 1982 Sales	Change from 1982 Earnings	Profit margin[b] 1983	Profit margin[b] 1982	Sales ($ millions)	Earnings[a] ($ millions)	Change from 1982 Sales	Change from 1982 Earnings
Air Products	$ 416.2	$ 29.4	0%	9%	7.1%	6.5%	$ 1,246.1	$ 81.1	4%	1%
American Cyanamid	889.5	41.1	3	52	4.6	3.1	2,612.2	111.2	0	19
Celanese	811.0	33.0	14	def	4.1	def	2,411.0	60.0	3	200
Chemed	67.3	4.8	5	23	7.1	6.1	192.9	13.3	2	2
Crompton & Knowles	56.3	1.2	8	87	2.1	1.2	171.5	4.6	6	70
Dow Chemical	2,762.0	86.0	8	146	3.1	1.4	8,028.0	233.0	0	12
Ethyl	449.4	30.0	9	30	6.7	5.6	1,293.2	79.1	5	16
First Mississippi	57.8	0.7	17	−86	1.2	10.2	169.0	6.9	4	−49
Freeport-McMoRan	194.7	26.6	5	35	13.7	10.6	585.1	61.7	5	9
H. B. Fuller	109.2	4.3	37	72	3.9	3.1	315.5	9.7	34	47
W. R. Grace	1,506.0	28.1	4	−37	1.9	3.1	4,465.7	101.7	−2	−49
Hercules	670.0	43.8	5	58	6.5	4.4	1,985.0	124.0	−1	62
International Flavors	115.6	17.5	5	11	15.1	14.3	363.4	56.8	3	6
International Minerals	326.0	19.8	0	−19	6.1	7.5	1,136.0	54.2	−4	3
Loctite	59.0	6.2	11	72	10.5	6.8	171.6	16.2	6	60
Lubrizol	201.7	15.2	0	28	7.5	5.9	601.1	44.7	−4	9
Monsanto	1,553.0	99.0	3	39	6.4	4.7	4,648.0	303.0	−4	−1
Morton Thiokol[c]	479.3	29.6	—	—	6.2	7.5	1,370.7	72.7	—	—
Nalco Chemical	165.7	17.0	4	8	10.3	9.9	489.3	49.2	1	13
National Distillers	632.1	11.5	41	−26	1.8	3.5	1,882.4	36.9	37	−29
Olin	486.3	13.0	12	16	2.7	2.6	1,449.7	59.6	3	5
Pennwalt	247.3	13.8	6	89	5.5	3.1	731.7	26.9	0	10
Petrolite	72.2	5.4	−2	−21	7.5	9.2	216.4	17.2	−6	−24
PPG Industries	930.0	69.6	11	59	7.5	5.2	2,720.0	164.6	10	45
Reichhold Chemicals	194.7	5.5	2	400	2.8	0.6	568.0	16.3	−7	99
Rohm & Haas	458.7	32.1	4	87	7.0	3.9	1,442.1	108.9	0	75
Stauffer Chemical	285.8	−42.5	1	def	def	5.0	941.2	−22.5	−23	def
Union Carbide	2,274.1	80.6	5	14	3.5	3.3	6,645.7	190.2	−2	−32
Williams Cos.	381.6	8.0	0	def	2.1	def	1,143.7	19.1	−14	−24
Witco Chemical	358.0	13.9	8	83	3.9	2.3	1,024.4	37.0	2	67
Total 15 largest companies[d,e]	**$14,699.2**	**$624.8**	**7%**	**53%**	**4.3%**	**3.0%**	**$43,343.5**	**$1745.6**	**1%**	**−10%**
Second 15 companies[d]	**$ 2,511.3**	**$109.5**	**5%**	**−27%**	**4.4%**	**5.9%**	**$ 7,677.1**	**$ 392.2**	**−3%**	**−20%**
GRAND TOTAL[e]	**$17,210.5**	**$744.3**	**7%**	**34%**	**4.3%**	**3.4%**	**$51,020.6**	**$2137.8**	**0%**	**−12%**

a After-tax earnings from continuing operations, excluding extraordinary and nonrecurring items. b After-tax earnings as a percentage of sales. c Since merger of Morton and Thiokol, previous figures have not been restated, making comparison with prior data meaningless. d Division between large and smaller companies is about $375 million sales in third quarter. e Per cent change

chemicals picked up smartly. Production of chemicals and products was up about 12% over the previous year's third quarter. This pickup in production has raised plant use rates to the point where they can begin to take advantage of the efficiencies that have been instituted.

The exceptions to the good earnings performance were posted by companies that produce large quantities of agricultural chemicals. For most of these companies, the government's farm policies continued to clobber earnings as well as revenues in the third quarter.

However, overall it was a good quarter for chemical firms. Even the relatively unchanged prices, although causing complaints from producers, bode well for the future. With earnings increasing as they did in the third quarter, the lagging price picture continues to promise even greater earnings when prices do begin to turn around.

In one measure of the third quarter's performance, combined results for 30 leading chemical companies surveyed by C&EN increased substantially over last year's third quarter. For the 29 companies with comparable year-to-year results (Morton Thiokol is excluded, since after the merger of the two companies, earlier years' data were not restated) sales for the third quarter totaled $16.7 billion, an increase of 7% over third-quarter 1982. Earnings for these companies were nearly $715 million, a 34% increase over the same period last year.

As a result, profitability among the major chemical firms improved. The average profit margin on the cumulative sales of the 29 companies increased to 4.3% from 3.4% in 1982's third quarter.

However, for a change, the larger chemical companies by far outperformed the smaller ones. This seems partly because of the several agricultural chemical producers among the smaller firms.

NINE-MONTHS 1983		12-MONTH RUNNING DATA			
Profit margin[b]		Change from 1982		Profit margin[b]	
1983	1982	Sales	Earnings	1983	1982
6.5%	6.7%	4%	−5%	6.7%	7.3%
4.3	3.6	−2	0	4.2	4.1
2.5	0.9	−3	−18	1.4	1.7
6.9	6.9	0	−2	6.8	6.9
2.7	1.7	2	6	2.6	2.5
2.9	2.6	−4	−11	2.3	2.5
6.1	5.5	1	14	6.3	5.6
4.1	8.3	−18	−50	4.7	7.7
1.5	11.1	3	−3	11.6	12.2
3.1	2.8	30	21	2.9	3.1
2.3	4.4	−4	−45	2.6	4.5
6.2	3.8	−4	27	5.1	3.9
15.6	15.2	2	9	14.5	13.6
4.8	4.4	−4	−6	5.2	5.3
9.4	6.2	3	38	8.9	6.7
7.4	6.6	−5	−1	7.5	7.1
6.5	6.3	−5	0	5.8	5.6
5.3	5.4	—	—	—	—
10.1	9.0	−2	−5	10.1	10.4
2.1	4.0	23	−46	2.4	5.5
4.1	4.0	1	−7	3.5	3.8
3.7	3.3	−3	23	2.8	2.2
8.0	9.8	−7	−21	8.3	9.8
6.1	4.6	8	50	6.2	4.4
2.9	1.3	−10	75	2.3	1.2
7.6	4.2	−2	64	6.7	4.0
def	9.3	−16	def	def	8.7
2.9	4.1	−3	−49	2.4	4.6
1.7	1.9	−15	30	2.7	1.8
3.7	2.3	2	42	3.4	2.4
4.0%	**4.4%**	**−2%**	**−12%**	**3.6%**	**4.0%**
5.1%	**6.2%**	**−4%**	**−22%**	**5.1%**	**6.3%**
4.2%	**4.7%**	**−2%**	**−14%**	**3.9%**	**4.4%**

and profit margin averages exclude results of Morton Thiokol. def = deficit.

For the 14 larger companies with comparable year-to-year data (again minus Morton Thiokol), sales for the quarter increased 7% to $14.2 billion. Earnings jumped 53% to more than $605 million. As a result, profit margins rose to 4.3% from only 3.0% in the third quarter last year.

Smaller firms (sales below about $375 million) as a group did not perform as well. However, this group was weighted down by Stauffer Chemical, which had a $42.5 million loss in the quarter. Sales for the 15 smaller companies totaled $2.51 billion, a 5% increase from the third quarter last year. Earnings for the group amounted to almost $110 million, down 27% from third-quarter 1982. This gives an average profit margin of 4.4%, well off last year's 5.9%. If Stauffer is excluded from the group, earnings for the remaining 14 companies increased 21% over the year before, and profit margins rose to 6.8% from 6.0%.

The good results in the third quarter were not enough to produce a gain in earnings for the year thus far for the 29 chemical companies with comparable year-to-year data. For these firms sales were flat for the nine months at $49.6 billion. But earnings following two disastrous quarters were down 12% to $2.07 billion, producing a profit margin of 4.2% for the first nine months of 1983, compared with 4.7% for the same period last year.

For the larger companies, combined sales in the nine months inched up 1% to $42.0 billion. Earnings for this group, however, declined 10% to $1.67 billion, and the average profit margin slipped to 4.0% from 4.4%.

For the 15 smaller companies, nine-month sales dropped 3% from the comparable 1982 period to $7.68 billion, and earnings plunged 20% to about $392 million. Thus, average profit margin through the first nine months of 1983 was 5.1%, compared with 6.2%.

Chemical demand, of course, increased, but lower operating costs gave an extra boost to the earnings picture. Celanese chairman and chief executive officer John D. Macomber said, "I am particularly pleased by our improved profit margin. We have benefited from industrywide price increases and lower administrative and other operating costs." Celanese went from an $18 million loss in third-quarter 1982 to a profit of $33 million in the third quarter this year.

L. Stanton Williams, PPG chairman, said, "PPG's improved performance in the third quarter was based largely on the economic recovery and our own productivity gains and cost containment. We expect these factors to contribute to continued earnings strength for the balance of the year."

Productivity gains also helped oil and diversified firms in the third quarter. As in the second quarter, oil and gas companies and diversified companies with chemical operations reported increases in earnings far greater than those for sales revenues. Among the 19 largest oil and gas companies with chemical units, in fact, cost control measures, as well as some improvement in nonenergy segments, made possible an overall earnings increase of 7% despite an overall revenue decline of 5% (excluding all nonrecurring gains and charges). The disproportion between sales and earnings among the 25 largest diversified companies with chemical operations was even more marked: Operating revenues moved up a modest 5%, but earnings soared 32% overall.

Typical among oil and gas firms was Sun Co., which reported a 10% rise in earnings on a 5% decline in sales. "The continued improvement in our level of profit performance is largely the result of reductions in operating and administrative expenses," says Sun chief executive Theodore A. Burtis. Other companies say much the same.

They certainly could not credit oil and gas with the earnings rebound. As Shell Oil president John F. Bookout remarks in his company's earnings statement, lower crude oil prices and reduced demand for natural gas sent energy segment net income down. Positive factors, he adds, were increased crude oil production and higher gas prices. The pluses, however, evidently failed to outweigh the minuses in most cases.

As a result, although 13 of 16 energy companies reporting financial results registered a decline in revenues, 11 of them recorded increases in earnings. The most successful firm in the quarter was Occidental Petroleum, with a 405% jump in net income on 11% sales growth. Other healthy earnings gains were

Energy earnings rise despite sales drop, and diversified net income soars

	% chemical sales	THIRD-QUARTER 1983 Sales ($ millions)	Earnings[a] ($ millions)	Change from 1982 Sales	Change from 1982 Earnings	Profit margin 1983	Profit margin 1982	NINE-MONTHS 1983 Sales ($ millions)	Earnings[a] ($ millions)	Change from 1982 Sales	Change from 1982 Earnings	Profit margin 1983	Profit margin 1982
OIL AND GAS COMPANIES													
American Petrofina	11	$ 565.1	$ 23.0	5%	81%	4.1%	2.4%	$ 1,583.5	$ 31.9	−8%	−19%	2.0%	2.3%
Atlantic Richfield	8	6,378.4	405.1	−4	−1	6.4	6.1	19,220.8	1128.8	−3	−6	5.9	6.1
El Paso	15	1,100.0	25.0	4	−7	2.3	2.5	3,300.0	62.2	3	−6	1.9	2.1
Exxon	7	23,342.0	1225.0	−7	20	5.2	4.0	69,928.0	3360.0	−9	24	4.8	3.5
Getty Oil	2	2,900.0	184.0	−6	1	6.3	5.9	9,000.0	505.0	−4	−3	5.6	5.5
Gulf Oil	7	7,514.0	246.0	0	29	3.3	2.5	21,401.0	612.0	−5	5	2.9	2.6
Internorth	8	985.9	30.1	23	75	3.1	2.1	3,403.8	164.2	15	9	4.8	5.1
Kerr-McGee	13	898.3	39.7	−2	−30	4.4	6.2	2,584.4	101.3	−6	−34	3.9	5.5
Mobil	4	14,247.0	404.0	−7	42	2.8	1.8	42,937.0	1056.0	−10	30	2.5	1.7
Occidental Petroleum	na	4,908.0	126.7	11	405	2.6	0.6	14,413.8	163.1	12	6	1.1	1.2
Phillips Petroleum	15	3,890.0	176.0	−3	15	4.5	3.8	11,320.0	474.0	−4	−3	4.2	4.2
Shell Oil	15	5,122.0	449.0	1	2	8.8	8.7	14,638.0	1084.0	−3	−7	7.4	7.8
Standard Oil of California	3	7,654.0	509.0	−12	11	6.7	5.3	21,740.0	1187.0	−23	25	5.5	3.4
Standard Oil (Ind.)	9	7,200.0	629.0	−6	3	8.7	7.9	22,100.0	1454.0	−1	−0	6.6	6.5
Standard Oil (Ohio)	4	2,995.0	435.0	−10	−11	14.5	14.7	8,862.0	1113.0	−14	−21	12.6	13.7
Sun Co.	3	3,770.0	167.0	−5	10	4.4	3.8	11,290.0	392.0	−7	2	3.5	3.2
Tenneco	7	3,433.0	159.0	−5	−21	4.6	5.5	10,608.0	475.0	−4	−15	4.5	5.1
Texaco	3	10,600.0	331.0	−10	−19	3.1	3.5	30,600.0	977.0	−16	−10	3.2	3.0
Unocal (Union Oil)	11	2,731.6	180.2	−1	−15	6.6	7.7	8,012.6	447.9	−2	−23	5.6	7.1
DIVERSIFIED MANUFACTURERS													
Allied	25	2,610.0	98.3	6	61	3.8	2.5	7,999.0	322.3	0	28	4.1	3.2
Aluminum Co. of America	11	1,393.7	35.4	22	def	2.5	def	3,798.3	68.3	6	178	1.8	0.7
Beatrice Foods	5	2,372.7	87.1	2	3	3.7	3.6	6,965.9	242.1	2	5	3.5	3.4
Borden	30	1,074.5	39.6	2	−8	3.7	4.1	3,095.9	107.9	2	17	3.5	3.1
Borg-Warner	19	891.7	44.9	10	24	5.0	4.5	2,586.3	125.4	8	5	4.8	5.0
Diamond Shamrock	31	1,014.5	38.9	31	−8	3.8	5.5	2,848.3	69.8	18	−32	2.5	4.3
Du Pont	33	8,845.0	295.0	8	74	3.3	2.1	26,296.0	760.0	5	22	2.9	2.5
Eastman Kodak	20	0.0	0.0	0	0	0.0	0.0	0.0	0.0	0	0	0.0	0.0
Engelhard	12	397.1	19.1	−26	12	4.8	3.2	1,625.5	53.2	15	12	3.3	3.4
FMC	38	841.6	45.6	−2	57	5.4	3.4	2,573.6	116.0	−1	9	4.5	4.1
General Electric	4	6,550.0	499.0	3	11	7.6	7.1	19,370.0	1445.0	2	12	7.5	6.8
Georgia-Pacific	12	1,709.0	3.0	20	def	0.2	def	4,827.0	89.0	20	−6	1.8	2.4
B. F. Goodrich	35	852.7	14.1	7	def	1.7	def	2,380.0	12.4	3	1278	0.5	0.0
Kaiser Aluminum	22	691.1	−36.8	−1	def	def	9.1	2,052.4	−116.9	−9	def	def	0.4
Koppers	34	450.8	20.1	−1	5	4.5	4.2	1,118.7	17.1	−7	7	1.5	1.3
Eli Lilly	27	708.1	103.9	6	24	14.7	12.4	2,280.6	342.0	2	10	15.0	13.9
3M	15	1,801.0	178.0	7	5	9.9	10.0	5,283.0	504.0	5	5	9.5	9.5
Merck	21	797.7	109.0	6	15	13.7	12.5	2,390.4	346.0	5	10	14.5	13.9
NL Industries	35	331.9	−0.1	−32	def	def	7.0	1,050.0	−47.1	−40	def	def	11.4
Northwest Industries	20	419.6	1.7	−7	−75	0.4	1.5	1,440.1	4.9	−25	−97	0.3	9.3
Pfizer	11	945.8	110.1	3	52	11.6	7.9	2,777.1	327.9	6	35	11.8	9.3
Tyler	35	247.3	6.7	10	56	2.7	1.9	689.3	13.6	5	77	2.0	1.2
Uniroyal	27	509.1	13.7	8	219	2.7	0.9	1,505.4	36.9	1	171	2.5	0.9
U.S. Steel	6	4,593.0	−41.0	2	def	def	def	12,816.0	−339.0	−12	def	def	def
Upjohn	17	477.5	37.0	11	84	7.7	4.7	1,480.8	126.5	8	25	8.5	7.4
Vulcan Materials	29	233.8	20.7	18	15	8.9	9.1	588.3	36.1	7	−22	6.1	8.4

a From continuing operations, excluding extraordinary and nonrecurring items. def = deficit. na = not available.

reported by American Petrofina, up 81%; Mobil, up 42%; Gulf Oil, up 29%; and Exxon, up 20%. The worst performers, all with declines in both sales and earnings, were Unocal (parent of Union Oil of California), down 15%; Texaco, down 19%; and Tenneco, down 21%.

For the fourth quarter, most oil and gas companies are taking a cautiously optimistic stance. Tenneco chief executive James L. Ketelsen, for instance, sees no sharp upturn, just "progressive improvements."

The economic recovery has had a far greater impact on the diversified companies with chemical operations. Although only 12 of the 25 largest firms managed to raise net income in the second quarter, 19 of them did so in the third. And not only have earnings generally improved from quarter to quarter this year, 17 of the companies reported earnings for the first nine months of 1983 higher than in the same period last year.

The standout among the diversifieds was Du Pont, which recorded an 8% increase in sales revenues and a 74% rise in earnings. "We are very pleased with the quarter's results," says chief executive Edward G. Jefferson. "This is the strongest quarterly performance we have had since the fourth quarter of 1981 as we continue to benefit from the economic recovery and ongoing cost-reduction programs."

Du Pont even managed to dodge the oil bullet; earnings from its energy segment actually rose slightly in the third quarter. The real boost, however, came from fibers, other polymers, and, to a far lesser extent, agricultural and industrial chemicals. After-tax operating income from the aggregate of chemical and related products grew 212%. Physical sales volume was up 11%, Du Pont says, and for the nine-month span, sales are running at 72% of capacity, compared to 67% for the same period in 1982.

There were many other examples of high earnings growth. Uniroyal continued its rocket ride with a 219% rise in net income, thanks mostly to strong performance by its chemical, rubber, and plastic materials segment. Company earnings, which shot up 142% in the second quarter, were up 171% in the nine-month period. Upjohn led the drug houses with 84% earnings growth. Big cost reductions were a significant factor in the gain, the company says. FMC, despite an overall sales decline, recorded a 57% earnings increase, mainly because of cost controls and higher revenues from industrial chemicals and defense equipment. Allied registered its first significant growth in earnings this year, a 61% jump stemming from good performance by its chemical, automotive, and aerospace segments.

There were losers as well, of course. Three companies posted deficits: Kaiser Aluminum & Chemical, with smaller, but still major, losses from aluminum and an increased loss from agricultural chemicals; NL Industries, hurt by continued weakness in the oil field chemical area; and U.S. Steel, with smaller, but massive losses from steel operations. □

Energy company petrochemical earnings surge

Energy companies produced a stunning overall turnaround in earnings from petrochemical operations during the third quarter. Eight oil and gas companies reporting after-tax net income from their chemical segments went from an aggregate deficit of $134 million in third-quarter 1982 to a combined gain of nearly $204 million in third-quarter 1983. The impact of the July-to-September surge shows in the nine-month data: Overall, the eight firms moved from a $7.9 million deficit to a $243 million net in a year-to-year comparison. At the end of the first six months of 1983, by contrast, energy company chemical earnings still were 25% below the first-half 1982 level.

The return of Gulf Oil's chemical segment to profitability was the most dramatic change. Even though as much as $28 million of the $63 million in reported earnings probably comes from the sale of property, the remaining income still marks the first nondeficit quarter for chemicals in a long time. Chief executive James E. Lee stresses higher product prices as the prime reason Gulf was able to make some money on chemicals again.

Higher chemical prices provided a bright spot for many of the energy companies, whose petroleum was still selling low in the third quarter. Internorth, for example, which recorded an impressive 30% jump in corporate earnings, gives most of the credit to its chemical segment, even though it accounts for only about 8% of the firm's overall sales. "The biggest factor contributing to the third-quarter improvement in primary earnings was higher prices for low-density polyethylene," says chief executive Sam B. Segnar.

Earnings statements from around the oil and gas industry comment in general on higher sales, improved margins, and increased capacity utilization for the chemical segments. Exxon, for instance, with chemical net up 111% during the first nine months, attributes its growth to a 6% rise in global chemical sales volume and continuing cost reductions. "Margins in the 1983 period have averaged below those of the prior year," notes chief executive Clifton C. Garvin Jr., "but improvement has occurred in the most recent quarter, particularly in the U.S."

AFTER-TAX EARNINGS ON CHEMICALS

$ Millions	Third quarter			Nine months		
	1983	1982	% change	1983	1982	% change
Exxon	$65.0	$ 16.0	306%	$150.0	$ 71.0	111%
Getty Oil	10.4	3.0	247	−19.7	22.0	def
Gulf Oil	63.0	−137.0	def	−2.0	−194.0	def
Internorth	5.5	−2.8	def	3.5	0.9	289
Mobil	7.0	7.0	0	0.0	33.0	−100
Occidental Petroleum	−3.3	−5.5	def	−3.5	−24.8	def
Shell Oil	14.0	−15.0	def	39.0	1.0	3800
Standard Oil (Ind.)	42.0	0.0	def	76.0	83.0	−8

def = deficit.

Canadian Chemical Sales, Profits Improve

The third quarter was another strong one for Canadian chemical company profits. After five consecutive quarters during which profits were meager or nonexistent, the Canadian chemical industry has put together two profitable quarters back to back.

In the third quarter, for instance, C-I-L Inc. boosted its net income 800% over the third quarter of 1982, admittedly from an extremely small base. Du Pont Canada turned last year's $5 million (Canadian) loss into a $10 million profit. Celanese Canada and Union Carbide Canada also converted the red ink of last year's third quarter into black ink this year. For Carbide, it was the end of a five-quarter string of losses.

As a group, these four publicly reporting companies increased third-quarter sales 13.7% over those in the comparable 1982 period to almost $809 million. Their combined bottom line went from a $17 million loss last year to $20.5 million this year.

This is the stuff of which comebacks are made. It also is the stuff which stimulates dividends. Union Carbide Canada declared a dividend payable Dec. 1. It will be the first common share dividend paid by the company since June 1, 1982. And Du Pont Canada substantially increased its third-quarter dividend over those paid in the previous three quarters.

But, as gratifying as the third quarter was, all is not yet completely well with the Canadian chemical industry. Much of the earnings improvement reflects increased sales, rather than corresponding increases in prices. The all-important export market still is sluggish. And company earnings still have a long way to go to recapture those heady days before the recession.

Du Pont Canada's experience typifies the disparity between domestic and export sales. Du Pont's sales in the third quarter were up 15% over last year to about $273 million. Sales in Canada were up 21%, but export sales were 8% lower. For Union Carbide Canada, the difference between Canadian and export sales performance is even more dramatic. Carbide's domestic sales increased 13% in the third quarter, but export shipments declined a hefty 47%.

The lingering effects of the recession and high up-front taxes on petrochemicals continue to plague Union Carbide. Sales of batteries, chemicals, food casings, film products, and home products all rose, but polyethylene and automotive products sales were lower. Sales of gases, metals, and carbon also were down from last year, primarily because of the low operating rates in the steel industry.

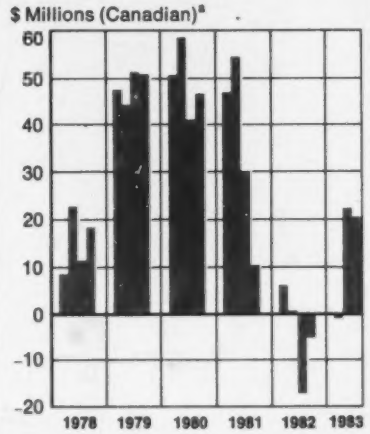
Still, Carbide has to be pleased with its third-quarter results. The company netted $3.4 million on sales of $179 million, which is a lot better than the $9 million loss it suffered in last year's third quarter. For the nine months, Carbide has reduced its loss from last year's $14.9 million to $5.5 million this year. These results, however, reflect a $7.5 million benefit that the company received as a result of government financial assistance given to Petromont, the Montreal petrochemical core company. Carbide has a one-third equity interest in Petromont.

For Celanese, the third quarter was particularly gratifying. It turned last year's $3.4 million loss into a $1.5 million profit, even though the third quarter traditionally is a weak one for the company. This is because the textile and garment industry, an important Celanese customer, usually shuts down for vacations in this period.

Ernest H. Drew, Celanese president and chief executive officer, expects sales and earnings to improve again in the fourth quarter. Other Canadian chemical executives tend to agree.

Earl Anderson, New York

Another profitable quarter recorded



a After-tax earnings of four largest publicly reporting Canadian chemical companies—Celanese Canada, C-I-L, Du Pont Canada, and Union Carbide Canada.

Earnings up for three of four major Canadian chemical firms

$ Millions (Canadian)	Nine-months 1983 Net sales	Change from 1982	Net income[a]	Change from 1982	Profit margin[b] 1983	Profit margin[b] 1982
C-I-L Inc.	$ 844.0	2.1%	$19.9	15.0%	2.4%	2.1%
Celanese Canada	284.5	23.3	5.3	c	1.9	d
Du Pont Canada	819.0	9.4	22.7	c	2.8	d
Union Carbide Canada	505.6	6.4	−5.5	c,d	d	d
TOTAL	$2453.1	5.2%	$42.4	c	1.7%	d

a Net income from continuous operations, excluding extraordinary gains or losses. b Net income as a percentage of sales. c Deficit in 1982. d Deficit in 1983.

Petrochemical surge from developing countries nears

It's no longer theory, a point in long-range planning. The new wave of basic petrochemical production from hydrocarbon-rich developing countries has reached the world's large chemical markets and will hit white-cap proportions barely more than a year from now. At that time, the core petrochemical units in Saudi Arabia will go through a rapid-fire series of startups.

For the many corporate eyes in developed countries watching this wave come closer, two experts speaking at the American Institute of Chemical Engineers diamond jubilee meeting in Washington, D.C., earlier this month had some polite but pointed advice: Accept the new output in the face of its overwhelmingly favorable economics, and, if you remain in petrochemicals, know precisely why. Trim operations that don't make sense, and plan expansions with the greatest of care.

From the heart of the new petrochemical development, Mohamed H. Al-Mady, senior vice president of Saudi Petrochemical Co., used conciliatory language but left no doubt of Saudi intentions: Saudi pricing will be geared "to make an orderly entrance into world markets. It is recognized that the economic health of Saudi Arabia is tied to that of other nations, particularly to the major trading partners in the West and in Asia. Because our future lies with our

Al-Mady: we intend to be competitive

friends, SABIC (Saudi Basic Industries Corp., the principal state agency in industrial development) does not wish to disrupt the industry by undercutting competitors. But we do intend to market, be competitive, and to be profitable."

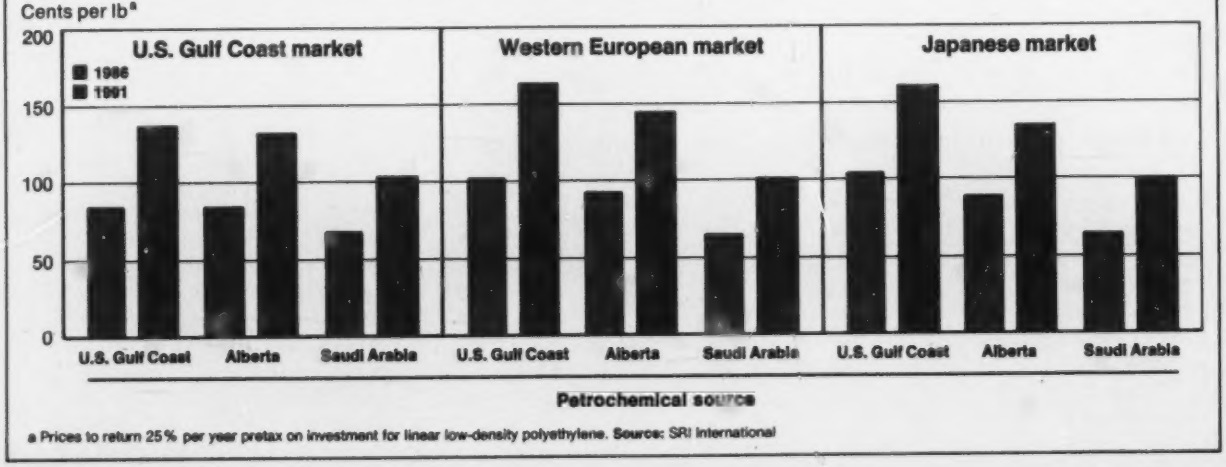
The Saudi production goal, Al-Mady continues, "once we have all of our plants on stream, is to produce 5% of the world's supply of bulk petrochemicals." With a large part earmarked for export, this will include more than a million metric tons per year of ethylene derivatives and another million metric tons of chemical-grade methanol.

How far will the new petrochemical wave go? Only up to a point, according to Al-Mady. "It is simply not possible for new producers to replace the traditional producers. In the near term, new producers do not have the capacity, and in the long term, it would make no sense."

Still, Al-Mady nudges developed-country petrochemical producers in new directions. "It makes far more sense, given the restructuring that is upon us, for the nations that traditionally have produced petrochemicals to shift more strongly toward the specialty products and processes that require the highly sophisticated specialists and technologies they already have."

For any doubters of Al-Mady's generalizing remarks, some eye-catching statistical backup was provided at the AIChE meeting by Andrew G. Kridl, vice president of the chemicals and resources division of SRI International. Kridl notes as a negative for traditional producers the new petrochemical supply from OPEC (Organization of Petroleum Exporting Countries). For example, to get a 25% annual return on polyethylene investment in the U.S. Gulf Coast market, Saudi producers will need to charge just 65 cents a lb in 1986 and $1.00 in 1991, compared to corresponding prices of $1.02 and

Saudis will be able to undersell U.S., Canada, in all major markets



a Prices to return 25% per year pretax on investment for linear low-density polyethylene. Source: SRI International

$1.62 by U.S. producers on the very spot. Notes Kridl, "In a business where a 1 cent-per-lb variation in manufacturing costs can spell the difference between profit and loss, the extent of the OPEC advantage cannot be underestimated."

Mainly for this reason, Kridl doesn't see many hopeful signs for traditional petrochemical producers in the 1980s. To be sure, declining feedstock costs likely will bring price stability and better earnings, and demand growth is more likely to go up. But the OPEC challenge will be a big one. "It's not surprising," Kridl concluded, "that there is a pronounced movement among the traditional chemical companies that have not integrated backward into crude oil to gradually abandon the pure petrochemical field."

For companies remaining in petrochemicals, Kridl offers a four-part survival prescription: Tighten up planning to avoid suicidal, industrywide expansion; concentrate on specialty instead of commodity grades; shut down excess capacity; and stiffen pricing policy.

"To sum up, petrochemical companies in the future must forgo the me-too approach and eschew bloody battles to maintain their market share. Unless a company has some sort of a competitive advantage, be it product cost, technology, or marketing, it should not contemplate becoming a new producer. The possession of capital funds alone is not a good enough reason for entering the petrochemical business. Also, companies already in the business that do not have [a] competitive advantage should dispassionately reexamine whether they can profitably stay in the game." □

Capacity increases have outstripped demand

Thousands of metric tons	Capacity 1980	Capacity 1974	Capacity % change	Demand, % change	Capacity use 1981
U.S.					
Ethylene	17,946	10,522	71%	19%	72%
Low-density polyethylene	4,130	2,882	43	13	78
High-density polyethylene	2,757	1,478	87	61	73
Vinyl chloride	4,163	2,996	39	10	71
WESTERN EUROPE					
Ethylene	16,605	12,325	35	12	64
Low-density polyethylene	6,347	4,517	41	26	61
High-density polyethylene	2,477	1,566	58	37	64
Vinyl chloride	6,024	4,859	24	4	60

Source: SRI International

Can you afford

to pass up our special offer?

Until November 30, 1983, the Board of Trustees, Group Insurance Plans for ACS Members is offering members who are under age 45 and not presently insured under the ACS plan the opportunity to apply for $15,000 of Term Life insurance and $15,000 of Accidental Death and Dismemberment insurance (AD&D coverage) by answering only an underlying single health question.

Details have already been mailed to eligible members. If you have not received our mailing and are interested in this ACS-sponsored program, please contact: ACS Plan Administrator (C-358), Connecticut General Life Insurance Company, Hartford, Connecticut 06152. Or call collect (203) 726-4243 or 726-4540.

83072

CIRCLE 53 ON READER SERVICE CARD